



### IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant: KEIT

KEITH, ET AL

Conf.: 9045

Appl. No.:

10/820,992

Art Unit: 3643

Filed:

04/08/2004

Examiner: PARSLEY, David J.

For:

IMPROVED ACCURACY LESS LETHAL

PROJECTILE

### Declaration OF Jaime H. Cuadros

I, Jaime H. Cuadros, hereby state as follows:

- 1. I am one of the inventors and applicants of the above identified patent application.
- 2. The less-lethal projectile described in the patent application has improved accuracy over those of the prior art, due to the bore-rider stabilizer attached directly to the rear of the projectile.
- 3. The improved accuracy comes from the new bore-rider stabilizer, which provides two improvements to the old generic less-lethal bag projectile design.
  - a. The loss of accuracy in the vertical plane comes from the variation of exit velocity of a projectile caused by variation on the friction of the projectile and the gun barrel. The new low coefficient of friction bore rider, upon firing of the projectile, provides a lower and more consistent friction between the projectile and the gun barrel. This action produces a more uniform exit velocity from shot to shot. More uniform velocity reduces the variability of the droop of the projectile, all other variables being equal.

- b. The loss of accuracy in any other plane comes from aerodynamic forces acting unevenly on the flying projectile. The result is a larger impact area at the target for any number of shots. The new stabilizer improves the accuracy by equalizing the aerodynamic forces and transmitting the corrections necessary to the body of the projectile through the stiff petals of the stabilizer. The projectile is mass stabilized (no spinning) but any small deviations caused by aerodynamic forces are quickly corrected, before their small effect is amplified during the flight to target.
- 4. The gain in accuracy was demonstrated during the development testing of this projectile. The results of these tests are summarized on Table 1 (page 226) of my paper entitled "Improvements in Aerodynamic Design for KE Less-Lethal Projectiles," presented at the 22<sup>nd</sup> Ballistic International Symposium in Vancouver, BC, Canada, 14-18 November 2005.
- 5. The table shows the improvement in accuracy from a standard less-lethal bag projectile (ALS Power Punch) from impacting inside of a circle of 5 inches in diameter, to the new design QT-4 projectile impacting inside a 2.1-inch circle, all other variables being the same.
- 6. This accuracy comes at the cost of more parts and more time required to assemble the projectile. The sale price is about \$2.50 higher for the QT-4 projectile. However, the users are willing to pay the cost difference to get the improved accuracy, as shown in the attached copies of invoices showing the sale price difference.

Dated: October 16,2006

Jaime H Cuadros

MK BALLISTIC SYSTEMS
P.O.BOX 1097, HOLLISTER, CA 95024 PH. (800) 345-1504 FAX. (831) 636-8657

INV.#

37216

### PACKING LIST

TOTAL DUE	\$0.00	REF NO.	QTY	DESCRIPTION	PRICE EACH	TOTAL
Salesperson	MK	1		DECOMP HON	LAGII	IOTAL
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Terms						
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INTEREST OF 1.5% PER MONTH IS DUE IF PAYMENT IS MADE AFTER THE DUE DATE.

MK BALLISTIC SYSTEMS
P.O.BOX 1097, HOLLISTER, CA 95024 PH. (800) 345-1504 FAX. (831) 636-8657

36480 INV.#

## **INVOICE**

TOTAL DUE	\$875.00	REF NO.	QTY	DESCRIPTION	PRICE EACH	TOTAL
Salesperson	MK	KEP NO.	100	<del></del>	\$3.50	\$350.00
FEIN	77-0273619		100	P/N 4900 RB-1-FS	\$3.30	\$330,00
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	KANSAS CITY, MO					
Zip code	64197-0001					
Phone	812-854-3902				· · · · · · · · · · · · · · · · · · ·	
Fax	812-854-3762					
Company name	KANSAS CITY CENTER					
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MK BALLISTIC SYSTEMS
P.O.BOX 1097, HOLLISTER, CA 95023 PH. (800) 345-1504 FAX. (831) 636-8657

INV.#

37062

# INVOICE

TOTAL DUE	\$2,100.00	REF NO:	QTY	DESCRIPTION	PRICE	****
Salesperson	MK	-	<del></del>	DESCRIPTION	EACH	TOTAL
FEIN	77-0273619					
Invoice date	1/5/2006	0001	200	#4026 NON-LEAD/	5.05	
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Phone	812-854-3575		·			
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